



Forest Health Protection Pacific Southwest Region



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Report #NC14-02

To: Todd Hamilton, Forester, Shasta-Trinity National Forest

Subject: Trip report following site visit to Pilgrim Plantation units and natural forest stands along Harris Springs Road

At the request of Todd Hamilton and Craig Sewell, Foresters (Shasta-Trinity NF), a site visit was made to a 500 acre pine plantation on Pilgrim Creek Road and some natural mixed conifer stands along Harris Springs Road, both on the Shasta-McCloud Management Unit, on November 7, 2013. The objectives were to assess current stand conditions, identify insects and diseases present and provide management options for reducing insect and disease risk at these two sites. Todd Hamilton, Craig Sewell (Shasta-Trinity NF), Cynthia Snyder and Pete Angwin (FHP) were present.

Pilgrim Plantation

The Pilgrim Plantation consists of four units within two compartments totaling approximately 500 acres along the Pilgrim Creek Road (Figure 1) approximately 5 miles northeast of McCloud, CA (T40N, R2W, Sec 13, 14 and 24 Mount Diablo Meridian). The historical information presented by Todd Hamilton (Table 1) showed the units to be relatively uniform, approximately 50 years old with similar stand structure. Plot data taken earlier this year

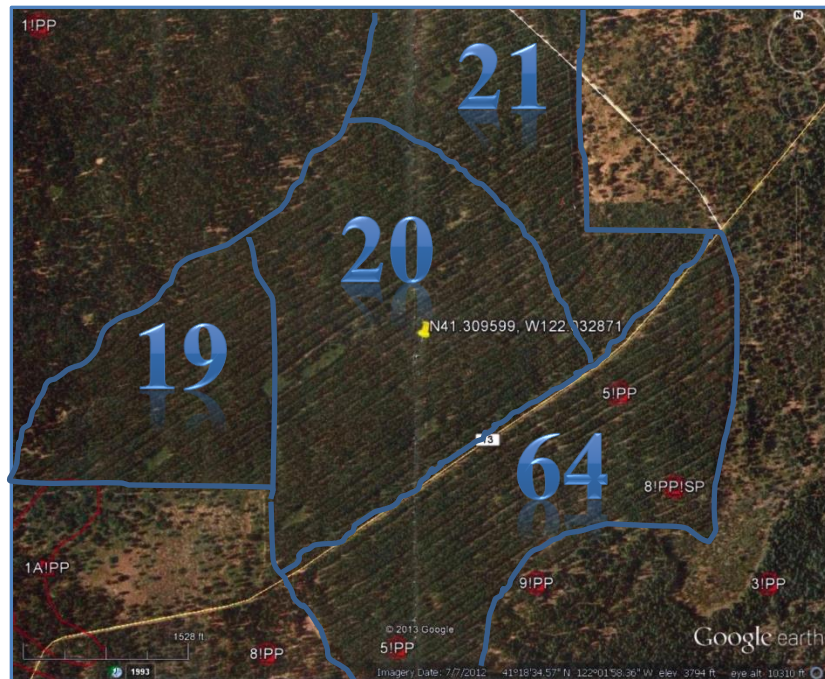


Figure 1. Google Earth view of the Pilgrim Plantation with 2012 ADS data overlay.

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conveyed an average stand density index of 220 and average diameter of 20 inches at breast height for all four units. The one difference found was a small group of Jeffrey pine located at the southwest corner of the plantation in unit 64.

Table 1. Historical stand data for the Pilgrim Plantation Units.

Acres	Unit	Activity	Year
141	21	Mech. Site prep	1962
	21	Burn piles	1962
	21	Plant PP	1963
	21	PCT	1975
	21	Comm. thin	1996
135	20	Mech. Site prep	1958, 1959, 1978
	20	Plant PP	1959, 1960, 1979
	20	PCT	1975
	20	Comm. thin	1996
67	19	Mech. Site prep	1958
	19	Burn piles	1958
	19	Plant PP	1959
	19	PCT	1975
	19	Comm. thin	1996
153	64	Mech. Site prep	1958
	64	Burn piles	1958
	64	Plant PP	1959
	64	PCT	1975
	64	PCT	1986
	64	Comm. thin	1998

Observations

✎ The first stop was to Unit 64 (N41° 18.183' W122° 02.044' elevation 3,763 ft). This was a ponderosa pine (*Pinus ponderosae*) plantation with an understory of ponderosa pine and white fir (*Abies concolor*) (Figure 2). At this stop we found bark beetle-caused mortality from western pine beetle in a pocket of about 8 trees. No root disease was noted at this location. The lack of root disease is notable because this location on the McCloud Flats is well known for an ongoing complex of black stain root disease (*Leptographium wagneri*) and western pine beetle activity. Although black stain root disease was not found at this stop, that does not necessarily indicate the absence of the disease nearby.

✎ We continued walking through the plantations to our next stop (N41° 18.200' W122° 01.966' elevation 3,761 ft) where we again found western pine beetle-caused mortality of

ponderosa pine in a pocket of about 10 trees (Figure 3). Again, no root disease was noted at this location.

✎ We continued walking through the plantations to our next stop (N41° 18.241' W122° 01.911' elevation 3,779 ft) where we again found western pine beetle-caused mortality of ponderosa pine in a pocket of about 3 trees (Figure 4). Again, no root disease was noted at this location.



Figure 2. Stop 1, overstocked ponderosa pine plantation with an understory of ponderosa pine and white fir.



Figure 3. Stop 2, overstocked ponderosa pine plantation with western pine beetle-caused mortality.

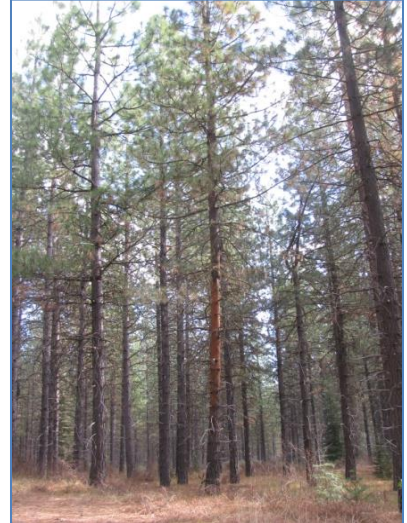


Figure 4. Stop 3, overstocked ponderosa pine plantation with western pine beetle-caused mortality.

✎ We continued walking through the plantations to our next stop (N41° 18.334' W122° 01.824' elevation 3,769 ft) where we again found western pine beetle-caused mortality of ponderosa pine in a pocket of about 8 trees. Black stain root disease was noted at this location (Figure 5).

✎ We continued walking through the plantations to our next stop (N41° 18.343' W122° 01.735', elevation 3,769 ft) (Figure 6) where we again found western pine beetle-caused



Figure 5. Blackstain root disease was found in recently dead ponderosa pine.



Figure 6. Ponderosa pine with western pine beetle and red turpentine beetle pitch tubes.

mortality of ponderosa pine in a pocket of about 3 trees older dead and 2 trees this year's mortality, still green. Black stain root disease was also noted at this location.

Discussion

Western pine beetle has been causing extensive mortality of ponderosa pine across McCloud Flats since the 1960s. Aerial survey data show that bark beetle attacks have been repeated in the same areas over many years indicating the presence of an underlying factor sustaining the continued attacks. Black stain root disease has not always been recognized as that underlying factor, and a lot of time and effort has been spent chasing the bark beetles. Due to repeated entries to salvage dead and dying trees, a lot of stumps were created on the Flats. These stumps provided the attraction of injured trees to the insects that vector the pathogen, which only increased the prevalence of the disease as the insects attacked nearby green trees. It is when drought strikes that the bark beetle-caused mortality is most evident; however, the black stain root disease causes a permanent stress on the trees which creates refugia for the bark beetles during good water years. Stumps are also the main entry court for infection of pines by spores of *Heterobasidion irregulare*, the pathogen causing Heterobasidion root disease in pine. Because the use of borate stump treatments did not become a routine treatment until the latest revision of the Forest Plan, there are numerous Heterobasidion root disease pockets on the Flats. Both black stain and Heterobasidion root disease may be present in the same stand.

Stands most susceptible to black stain root disease and bark beetle attack share many similarities (Table 2).

Table 2. Risk factors for bark beetles and black stain root disease.

<i>High risk of bark beetle mortality</i>	<i>High risk of black stain infection</i>
Overstocked	Overstocked
High percentage of pine in overstory, diameter > 8 inches	High percentage of pine in overstory, age > 40 years
Dry site or drought conditions	Cool, wet, mixed conifer site
History of tree stress and insect activity	Site disturbance, tree stress and insect vector activity

Under such conditions, tree mortality may, and has in many places on McCloud Flats, become a chronic problem.

If root disease is not present, the conventional zone of imminent mortality, due primarily to bark beetles, in pine plantations is an SDI of 230. In the stands of the Pilgrim Plantation, the average is SDI 220 with an average diameter of 20 inches. These factors combined with the presence of black stain root disease leads me to believe that there is a high level of risk of continued and expanding mortality, especially in drought years.

The designation of matrix ground increases the Forest's options in treating the units to reduce the risk of bark beetle-caused mortality in the near future. It was suggested that thinning the stands so that projected SDI remains below 200 for the next 20 years would greatly improve the residual trees defense against bark beetle attack and, if thinned heavily enough, may reduce the prevalence of the black stain root disease. Borate stump treatments should be required due to the presence of *Heterobasidion* root disease in the general area to prevent the spread of the disease.

Harris Springs Stands

Pockets of ponderosa pine mortality have been noticed in natural mixed conifer stands along the Harris Springs Road in 2013. These pockets resembled conditions of the Elk Flat LSR which caused concern due to the extreme mortality event that occurred there 2010-present (Report #NC12-04). Pockets of mortality covered several acres each with 20+ trees affected. We did not visit all of the stands of concern due to time restrictions. The two stops we made (N41° 18.095', W121° 46.508' at 4651 ft and N41° 17.931', W121° 46.137' at 4658 ft) convinced me that the risk of continued mortality is very high due to dense stocking, high pine component, large tree diameters, current beetle population (Figure 8) and current drought conditions.



Figure 8. Large pocket of ponderosa pine mortality caused by western pine beetle along Harris Springs Road.

The stands are mixed conifer, mostly ponderosa pine and white fir. No critical habitat is found east of Harris Spring Road where the mortality is located. The matrix land designation works in the favor of the land manager to address the current mortality and treat stands to reduce risk of continued mortality in a timely manner. It would be ideal to treat these stands before conditions deteriorate to the extent of the Elk Flat stands where 100+ acres of nearly contiguous mortality has created hazardous conditions for Forest visitors and staff as well.

The Harris Spring Road is highly used, as is the Pilgrim Creek Road, and there are many opportunities to highlight the treatments and provide context regarding the need to treat root disease as well as bark beetle-caused mortality.

If you have any questions regarding this report and/or need additional information, please contact Cynthia Snyder at 530-226-2437 or Pete Angwin at 530-226-2436.

/s/ Cynthia Snyder

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